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ASA-350-07

AMENDMENTS TO THE CLAIMS

1-26. (Canceled)

27. (Previously presented) A magnetic apparatus,  
comprising:

a perpendicular magnetic recording medium; and  
a magnetic head including a reproducing element arranged  
to perform reproduction from the perpendicular magnetic  
recording medium,

wherein said reproducing element has a magnetic-  
resistance element including a first non-magnetic metal layer,  
a second non-magnetic metal layer, and a magneto-resistance  
effect film formed between the first non-magnetic metal layer  
and the second non-magnetic metal layer,

said magneto-resistance effect film includes a first  
ferromagnetic layer, a second ferromagnetic layer, an  
intermediate insulating layer formed between the first  
ferromagnetic layer and the second ferromagnetic layer, and an  
anti-ferromagnetic layer formed between the second  
ferromagnetic layer and the second non-magnetic metal layer,  
and

said magneto-resistance effect film is arranged so that a  
tunnel current flows between the first ferromagnetic layer and

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the second ferromagnetic layer through the intermediate insulating layer.

28. (Previously presented) A magnetic apparatus according to claim 27, wherein a magnetization direction of said first ferromagnetic layer changes in the presence of a changing external magnetic field.

29. (Previously presented) A magnetic apparatus according to claim 27, wherein said perpendicular magnetic recording medium has a perpendicular magnetic recording layer comprising Co-Cr.

30. (Previously presented) A magnetic apparatus according to claim 27, wherein a magnetization direction of said second ferromagnetic layer is fixed by the anti-ferromagnetic layer which applies a bias magnetic field to the second ferromagnetic layer.

31. (Previously presented) In a magnetic apparatus of the type having a perpendicular magnetic recording medium and a magnetic head arranged to perform reproduction from the

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perpendicular magnetic recording medium, the improvement wherein:

the magnetic head includes a reproducing element, wherein said reproducing element has a magnetic-resistance element including a first non-magnetic metal layer, a second non-magnetic metal layer, and a magneto-resistance effect film formed between the first non-magnetic metal layer and the second non-magnetic metal layer,

said magneto-resistance effect film includes a first ferromagnetic layer, a second ferromagnetic layer, an intermediate insulating layer formed between the first ferromagnetic layer and the second ferromagnetic layer, and an anti-ferromagnetic layer formed between the second ferromagnetic layer and the second non-magnetic metal layer, and

said magneto-resistance effect film is arranged so that a tunnel current flows between the first ferromagnetic layer and the second ferromagnetic layer through the intermediate insulating layer.

32. (Previously presented) A magnetic apparatus according to claim 31, wherein a magnetization direction of

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said first ferromagnetic layer changes in the presence of a changing external magnetic field.

33. (Previously presented) A magnetic apparatus according to claim 31, wherein a magnetization direction of said second ferromagnetic layer is fixed by the anti-ferromagnetic layer which applies a bias magnetic field to the second ferromagnetic layer.